MetalSCAN

On-Line Oil Debris Monitor

MS Industrial

MetalSCAN is the proven industry-leading, reliable, advanced on-line condition monitor designed to detect and monitor metal particles generated from rotating equipment bearing or gear damage.

BENEFITS

Earliest reliable detection of component damage

Monitor damage progression and estimate remaining life

Avoid unplanned outages

Avoid equipment secondary damage

FEATURES

100% Detection of Fe and NFe metal particles

Easy to install

Easy to interpret

Rugged, solid-state with no moving parts

Full function continuous built-in test (BIT)

Proven reliability in harsh machinery environments

Proven reliability in high temperature environments

Proven reliability in hazardous environments

REQUIREMENT

The energy, marine, and aerospace industries require condition monitoring that is capable of detecting bearing and gear damage at the earliest stage of progression while providing insight into the extent of the damage and its impact on the remaining life of the equipment. It is understood that condition monitoring cannot be used to avoid damage occurring to the equipment, however, the right technique is used to effectively limit the damage and avoid outright failure of the equipment, where failure is defined as damage sufficient so that the equipment can no longer operate. Managing the risk from the context of the equipment operator is based upon planning the maintenance actions, thus achieving:

1) Reduction of lost revenue – the equipment can be scheduled to be out of service for the shortest possible time, where the replacement equipment parts, equipment, and maintenance crews are on site at the time of shutdown.

2) Reduction of repair costs - reduced equipment damage such that the extent of the repair is much less than if the equipment was to operate to failure.

An additional benefit of effective risk management is the potential for improved coverage from the insurers, which is delivered in terms of reduced premiums, reduced deductibles and/or reduced depreciation.

MetalSCAN
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MS Industrial System

DESCRIPTION

MetalSCAN is an on-line debris monitoring system designed to detect the passage of metallic particles in fluid lines. The system, which can be used in any pipe flow situation, is particularly suited to equipment applications where it detects metallic debris in a lubrication oil system and provides early indication of component damage.

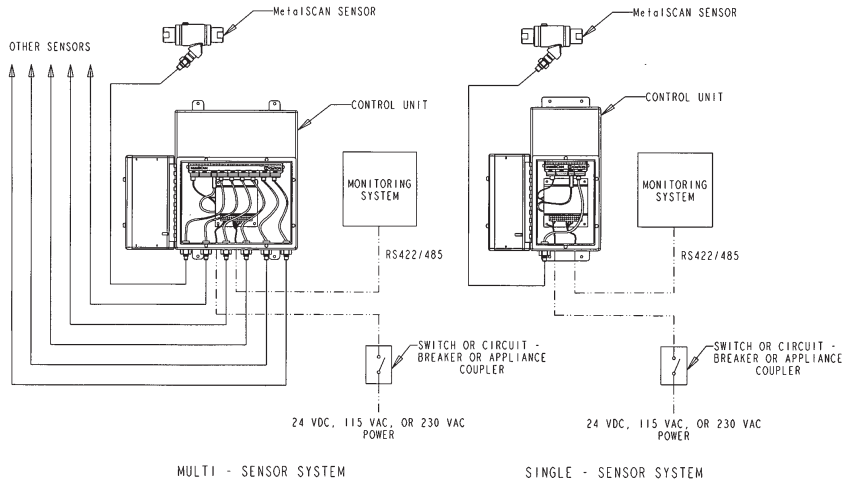
The MetalSCAN system consists of the following major components:

- A non-intrusive through flow Sensor which is fitted to the fluid line to be monitored.
- A custom low noise Sensor Cable which connects the sensor to the electronics.
- A Control Unit which processes the raw signal from the sensor and extracts information about the size and type (ferromagnetic or non-ferromagnetic) of the metallic debris detected.
- A host monitoring system which displays the current counts data, trend data, computes equipment health indices and announces warning/alarm exceedances. This function can be performed by an existing monitoring system host or by a dedicated standalone PC.

The MetalSCAN is available in two basic configurations defined by the Control Unit option:

1) Multi-Sensor System - which includes from 1 to 6 Sensors and Sensor Cables, each connected to a multi-sensor Control Unit.
2) Single Sensor System - which includes one Sensor, one Sensor Cable, and a single-sensor Control Unit.

SYSTEM		
Power Requirement	**115 or 230 VAC** (47 to 63 Hz)	**24 VDC**
Rated Current:		
Single-sensor	0.3A @115VAC or 0.2A @230VAC	1.5A
Multi-sensor	0.8A @115VAC or 0.4A @230VAC	2.0A
Communication Interface	RS485 Modbus	
Cabling Distance	up to 4000ft / 1200m	



COMPLIANCE:

North America
- Class I, Div 2, Groups A to D Hazardous Locations
- NEMA 250 (Type 4)[1]
- FCC part 15

CE Marking (24 VDC Version)
- IP 66

ATEX: CE Ex II 3G
IECEx: Ex nA IIB T4 GC

Pressure Equipment
- ASME B31.3B (Process Piping Standard)

Note 1:
NEMA 4 - Standard Enclosure
NEMA 4x - Stainless Steel Enclosure

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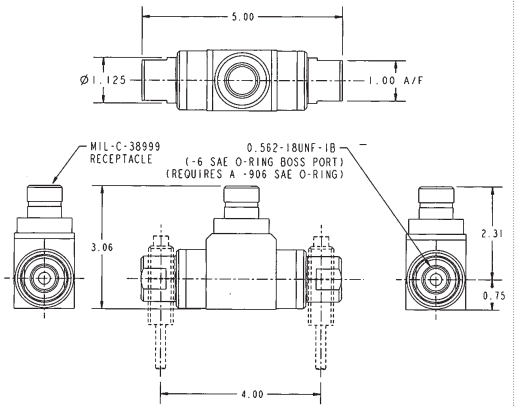
MS Industrial Sensor

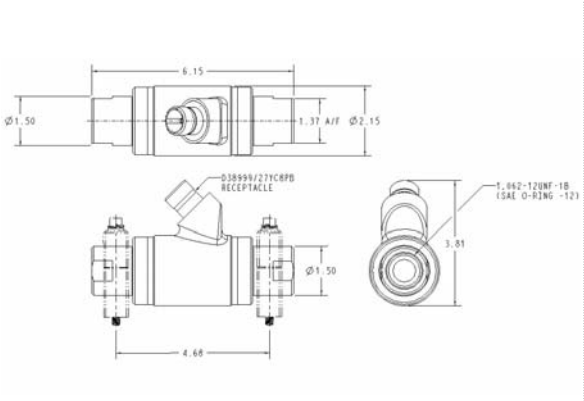
DESCRIPTION

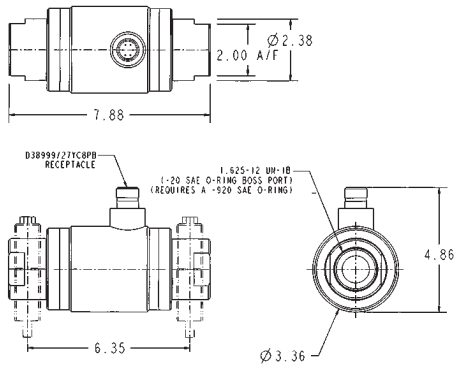
The MS Industrial Sensors are welded stainless steel assemblies designed to be installed directly into the fluid line with fluid flowing in either direction. The sensors are designed to operate in severe industrial and/or hazardous environments with large temperature extremes and high vibration levels. They are available in three sizes: 3/8", 3/4" and 1-1/4" nominal line diameter. The sensing element consists of three internal coils. The two outside field coils are oppositely wound and are driven by an alternating current source so that their respective magnetic fields are opposed and cancel at the center point between the field coils. The centrally positioned sense coil measures the disturbances in the magnetic fields caused by metallic particles as they pass through the sensor. The magnitude of the disturbance measured as a voltage defines the size of the particle and the phase shift of the signal defines whether the metallic particle is ferromagnetic (Fe) or non-ferromagnetic (NFe).

SENSOR			
Nominal Line Size	**3/8 inch**	**3/4 inch**	**1-1/4 inch**
Bore	0.30" / 7.6mm	0.70" / 17.8mm	1.06" / 26.9mm
Plumbing Connection (female)	-6 SAE o-ring	-12 SAE o-ring	-20 SAE o-ring
Minimum Ambient Temperature	-40°F / -40°C	-40°F / -40°C	-40°F / -40°C
Maximum Ambient Temperature	375°F / 190°C	375°F / 190°C	375°F / 190°C
Weight	1.5lbs / 0.7kg	2.0lbs / 0.9kg	5.5lbs / 2.5kg
Minimum Detectable Particle Size:			
Fe (ESD*/sphere)	65µm / 100µm	130µm / 200µm	180µm / 275µm
NFe silver (ESD*/sphere)	200µm / 305µm	270µm / 415µm	345µm / 530µm
FLUID CONDITIONS			
Maximum Temperature	375°F / 190°C	375°F / 190°C	375°F / 190°C
Maximum Pressure	500 psi / 3500 kPa	500 psi / 3500 kPa	100 psi / 700 kPa
Minimum Flow Rate	0.056 USGPM 0.21 L/min	0.50 USGPM 1.9 L/min	2.1 USGPM 8.0 L/min
Maximum Flow Rate	4.3 USGPM 16.2 L/min	48 USGPM 180 L/min	175 USGPM 665 L/min

* The Equivalent Spherical Diameter (ESD) of an irregular-shaped object is the diameter of a sphere of equivalent volume.







Brackets are optional

GASTOPS

www.gastops.com

MetalSCAN
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MS Industrial Control Unit

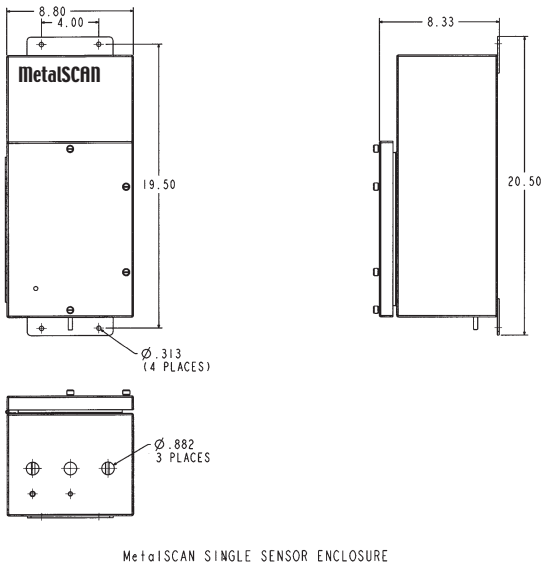
DESCRIPTION

The MS Industrial Control Unit houses the modular electronics for MS Industrial system and is available as either a multi-sensor enclosure with capacity for up to 6 sensors or a single-sensor enclosure designed for only one sensor. In either case, the enclosure is a steel housing designed for back-side mounting on a bulkhead or plate with all interconnecting cables entering through the bottom of the unit. Note that the electronics of the central unit cannot be relocated outside of this enclosure (i.e. in another rack) due to EMI and signal grounding control requirements.

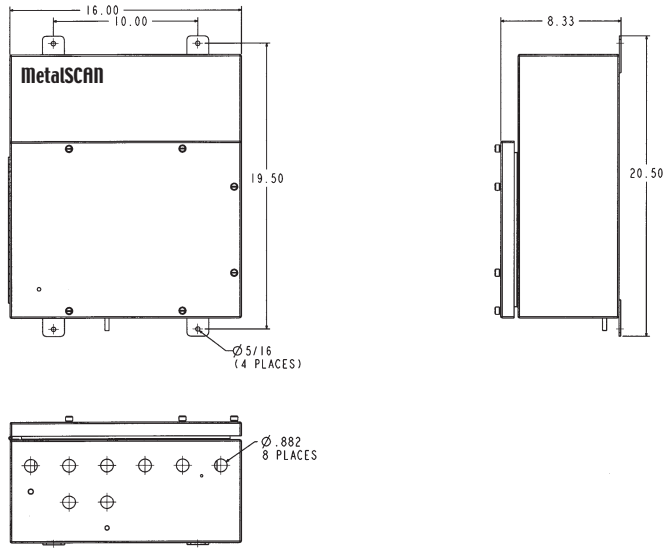
The multi-sensor Control Unit includes separate modules for power input, power supply, control, and sensor interface, each plugged into a backplane chassis. The chassis has a capacity for 6 separate sensor modules. The single sensor Control Unit is similar to the multi-sensor unit except it has the capacity to house only one sensor module.

Communication to the host is via industry standard Modbus RS485 serial communications which supports up to 30 separate Control Units (single or multi) can be linked together to a single host monitoring system communication port.

CONTROL UNIT		
Environment	Splash proof - for outdoor and indoor installations (IP66)	
Finish	Painted mild steel (blue) or optional stainless steel	
Enclosure Type	**Single-sensor**	**Multi-sensor**
Enclosure Size - nominal	8.80w x 20.5h x 8.33d (in) 224w x 521h x 212d (mm)	16w x 20.5h x 8.33d (in) 406w x 521h x 212d (mm)
Minimum Ambient Temperature	-40°F / -40°C	-40°F / -40°C
Maximum Ambient Temperature	131°F / 55°C	131°F / 55°C
Maximum Weight	25.5lbs / 11.6kg	36.0lbs / 16.3kg (6 sensors)



MetalSCAN SINGLE SENSOR ENCLOSURE



MetalSCAN MULTI-SENSOR ENCLOSURE

MetalSCAN
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MS Industrial Sensor Cable

DESCRIPTION

The MS Industrial Sensor is electrically connected to the Control Unit using the Sensor Cables provided as part of the MetalSCAN system. The inductive coils of the sensor assembly are designed to achieve maximum sensitivity to particles present in the flow. The cabling and connectors play a significant part in achieving the level of sensitivity necessary for the system to operate properly. The cables are factory assembled and available in 12 and 20 foot lengths. The result is an extremely robust cable connection system that provides assurance of the required detection performance and sensitivity.

A double shield is provided on each of the four coaxial cables within the cable assembly. Each coaxial cable is terminated at the Control Unit end via a BNC connector while at the sensor end the cables are brought together into a single aerospace grade MIL-DTL-38999 Series III connector. The coaxial cables are further shielded by a tinned copper braid covering and then mechanically contained by a high temperature silicone impregnated fibreglass sleeve.

SENSOR CABLE

Sensor Cable Length	**12ft / 3.7m**	**20ft / 6.1m**
Connector (sensor end)	MIL-DTL-38999 Series III	MIL-DTL-38999 Series III
Connectors (Control Unit End)	4x BNC	4x BNC
Minimum Ambient Temperature	-40°F / -40°C	-40°F / -40°C
Maximum Ambient Temperature	375°F / 190°C	375°F / 190°C
Weight	3lbs/ 1.4kg	4lbs/ 1.8kg

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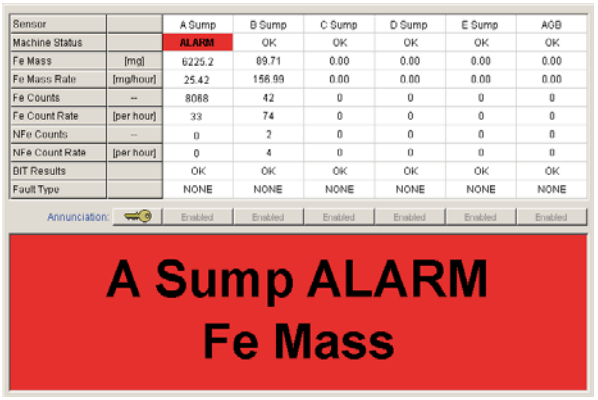
MetalSCAN Monitor Software

DESCRIPTION

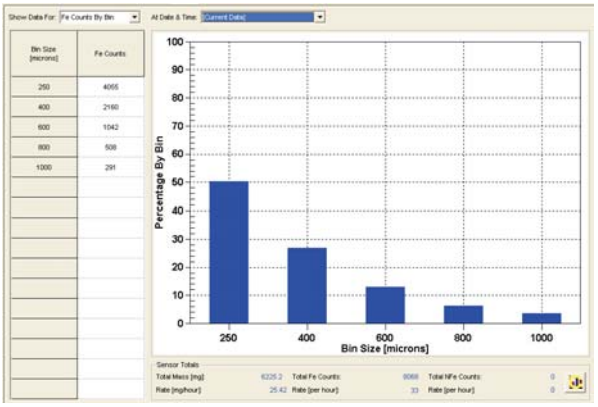
MetalSCAN Monitor is a PC software application that runs under Microsoft Windows designed to interface with one to thirty-one MetalSCAN systems and provide the user interface for tracking the health of the machine(s) being monitored. The software provides the capability to continuously record and display MetalSCAN data, to annunciate warnings and alarms when debris accumulation exceeds user-defined limits, and to interface to external data acquisition or monitoring systems.

MetalSCAN Monitor includes nine viewable display pages, which can be selected using the dedicated pushbutton controls located on the application toolbar. The three primary pages are the Status, Counts, and Trends pages.

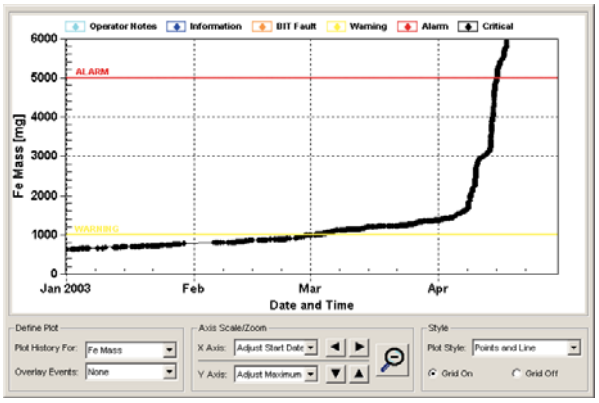
At the top level is the Status page which displays a summary status of the equipment being monitored in terms of the debris accumulation information and the status of the MetalSCAN System as reported by the built-in-test (BIT) function. The Status page is displayed automatically with high visibility color banners whenever MetalSCAN Monitor detects a new warning or alarm condition. The annunciation is designed so that the user cannot switch to another page until the warning or alarm condition has been acknowledged or the triggering condition clears. The user acknowledges the condition by clicking the 'banner', causing the banner display to disappear.



The Counts page provides high resolution current information of the accumulated debris including ferromagnetic (Fe) and non-ferromagnetic (NFe) count totals, categorized by size and by type, either Fe or NFe. It also provides a graphical display of size distribution by counts or mass, for any selected sensor.



The Trends page displays the time history of debris accumulation data along with the user-defined warning or alarm limits for the selected parameter, allowing the user to assess the current severity of the equipment condition, to review the time history, and to estimate the remaining operating life of the equipment.



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MS Industrial

Ordering Information

One Sensor MS Industrial System (Single) — Order: System - 01S

Including: 24 VDC single sensor control unit, 1 x 3/4" sensor, 1 x 20 ft. sensor cable, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

One Sensor MS Industrial System (Multi) — Order: System - 01M

Including: 24 VDC multi-sensor control unit, 1 x 3/4" sensor, 1 x 20 ft. sensor cable, USB/RS485 converter, MetalSCAN Monitor Software, user's manual,12 month warranty.

Two Sensor MS Industrial System — Order: System - 02M

Including: 24 VDC multi-sensor control unit, 2 x 3/4" sensors, 2 x 20 ft. sensor cables, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

Three Sensor MS Industrial System — Order: System - 03M

Including: 24 VDC multi-sensor control unit, 3 x 3/4" sensors, 3 x 20 ft. sensor cables, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

Four Sensor MS Industrial System — Order: System - 04M

Including: 24 VDC multi-sensor control unit, 4 x 3/4" sensors, 4 x 20 ft. sensor cables, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

Five Sensor MS Industrial System — Order: System - 05M

Including: 24 VDC multi-sensor control unit, 5 x 3/4" sensors, 5 x 20 ft. sensor cables, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

Six Sensor MS Industrial System — Order: System - 06M

Including: 24 VDC multi-sensor control unit, 6 x 3/4" sensors, 6 x 20 ft. sensor cables, USB/RS485 converter, MetalSCAN Monitor Software, user's manual, 12 month warranty.

Options:

MS Industrial Sensor - 3/8” — Order: Option - 13

Substitute 3/8" Sensor (per sensor), 12 month warranty.

MS Industrial Sensor - 1-1/4” — Order: Option - 05

Substitute 1-1/4" Sensor (per sensor), 12 month warranty.

MS Industrial Cable - 12ft — Order: Option - 06

Substitute 12 ft. Sensor Cable (per cable), 12 month warranty.

MS Industrial Stainless Steel Enclosure — Order: Option - 07

Substitute Stainless Steel Control Unit Enclosure, 12 month warranty.

MS Industrial ATEX Barrier Kit — Order: Option - 17x

MetalSCAN Barrier Kit for RS485 communication intrinsic safety isolation required for ATEX certification, including: barrier unit, serial null modem cable, ATEX system label, 12 month warranty.

TO ORDER, CONTACT:

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